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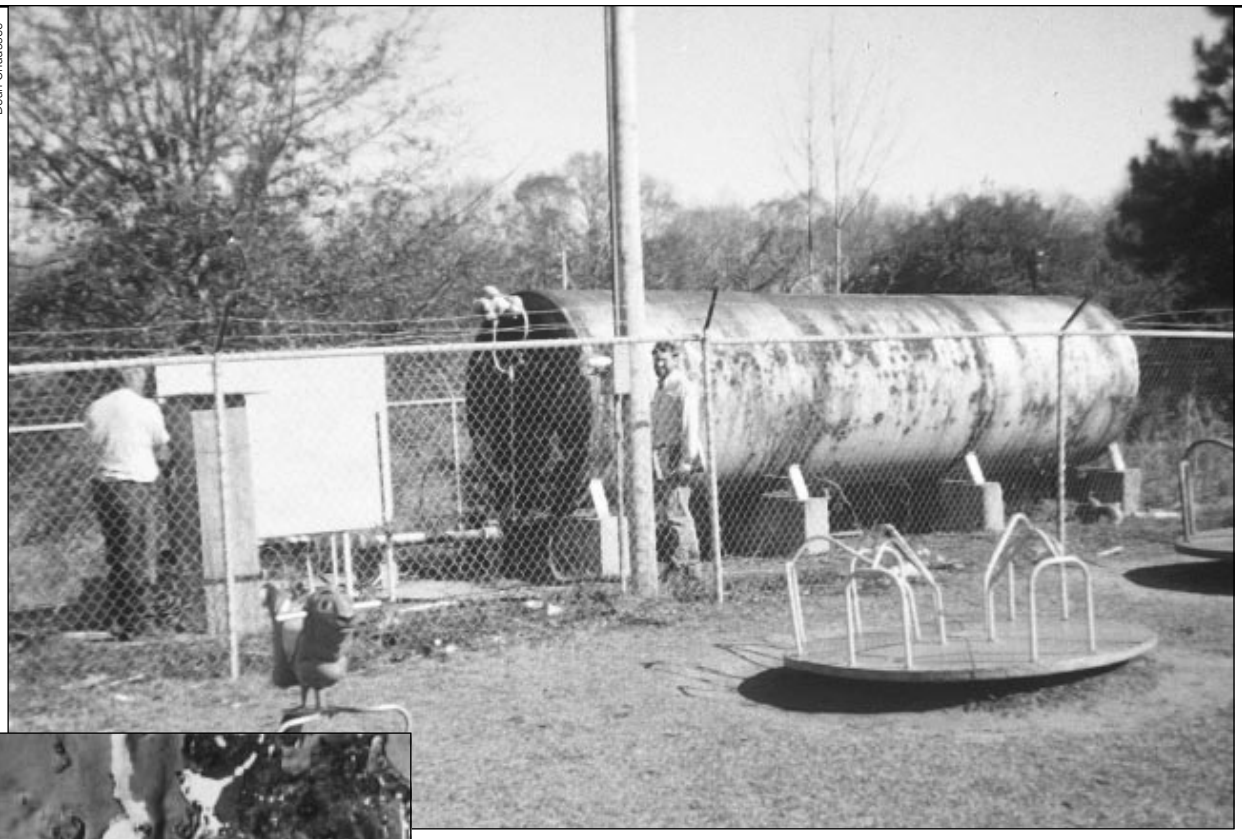

Hydropneumatic storage tanks use compressed air to pressurize small water systems. The insert is a close-up of corrosion on this tank. As these tanks age, corrosion can cause water quality to deteriorate and even pose a direct threat to safety. Hydropneumatic tanks can explode if they lose structural integrity. More than 6,500 small water systems currently need new hydropneumatic tanks or need to have their tanks refurbished.

Appendix A—Methodology

A workgroup was convened in 1994 to develop an approach for determining the drinking water infrastructure need for community water systems nationwide. The workgroup included staff and representatives of State drinking water agencies, American Indian and Alaska Native water systems, the Indian Health Service, and EPA regions and headquarters. The workgroup met in January 1994, August 1994, June 1995, and September 1995 to develop the survey methodology and design the resulting Report to Congress.

The methodology took into account the strengths and resource constraints of the different sizes of drinking water systems and developed different processes for collecting information from each one. Systems were broken down into three size classifications: large (those serving more than 50,000 people), medium (those serving from 3,301 to 50,000 people), and small (those serving 3,300 and fewer people). Exhibit A-1 shows the data collection method used, target precision levels, and number of systems surveyed for each size classification.

American Indian and Alaska Native water systems were surveyed separately.

Estimating Needs for Water Systems in the States: Large and Medium Systems. All 794 large community water systems and 2,760 of the 6,800 medium systems in the States received a mailed questionnaire package. Systems were asked to complete a matrix identifying those capital projects needed to continue supplying safe drinking water to their customers. The matrix included descriptions of each need, cost estimates for the project, and documentation. The questionnaire also requested information that could be used to model costs for those infrastructure projects that did not include a cost estimate.

Exhibit A-1: Approach to Statistical Survey in the States

Small Systems	Medium Systems	Large Systems
Up to 3,300 people	3,301 - 50,000 people	More than 50,000 people
Site Visit	Questionnaire	Questionnaire
Sample	Sample	Census
95% ± 10% Precision Nationally	95% ± 10% Precision by State	
540 Sampled 537 Completed	2,760 Sampled 2,563 Completed	794 Sampled 784 Completed

All questionnaires completed by water systems in States were sent to State drinking water staff for review. State staff reviewed the needs of the systems to ensure that all documentation was adequate, and forwarded the questionnaires to EPA headquarters for final review. Following this review, responses were entered into a database containing drinking water infrastructure needs from all systems surveyed.

Acceptable Documentation

The following types of documents were used to justify the need for projects. Asterisks indicate documents that also provide acceptable cost estimates.

Capital Improvement Plan*
Master Plan*
Facilities Plan*
Preliminary Engineer's Estimate*
State Priority List
Bilateral Compliance Agreement
Administrative Order/Court Order/Consent Decree
EPA or State Filtration or Ground Water Under Direct Influence Determination
Documentation of a Maximum Contaminant Level Violation, Treatment Technique Violation, or Lead and Copper Rule Exceedance
Grant or Loan Application Form*
Comprehensive Performance Evaluation Results
State-Approved Local/County Comprehensive Water and Sewer Plan
Sanitary Survey
Signed and dated statement from State, site-visit contractor, or system engineer clearly detailing infrastructure needs.

Many large and medium drinking water systems were able to provide high-quality documented estimates of the cost of the infrastructure need they had identified. If documented cost estimates were not provided, EPA used cost models to generate costs for documented projects. Cost models were developed from the estimates provided by other large and medium water systems. For a limited number of infrastructure needs, the survey collected insufficient information to develop cost models. Costs for these needs were modeled based on engineers' reports for similar projects around the country. All costs were converted to January 1995 dollars.

State-by-State and national needs for large drinking water systems were determined by summing the documented costs and modeled costs for all large systems. Large systems that did not respond were assigned a need of zero. For medium water systems, EPA calculated each State's need by extrapolating the results from the sample to the State as a whole. To assure accurate estimates of total State costs, EPA visited States to verify the number and size of the water systems in each State's database. This process allowed EPA to extrapolate with confidence to arrive at a total medium-system need for each State.

Estimating Needs for Systems in the States: Small Systems. The workgroup estimated small water system needs using a national statistical model. To identify needs, EPA staff visited 537 of the over 46,500 small water systems to determine needs through on-site assessments. In most cases, State representatives accompanied EPA staff on the visits. Information collected during these assessments was reviewed by State and EPA staff and then entered into the national database.

Most small systems did not have documented cost estimates for the projects identified. Because of this, data provided by States, engineering firms, and larger systems were used to develop cost models for small water system needs. The costs derived from these models were used to extrapolate total costs from the systems surveyed to the nation as a whole. State inventories of small systems were checked for accuracy.

Estimating Needs for American Indian and Alaska Native Water Systems. American Indian and Alaska Native water systems fall into two size categories: medium and small. There are 15 medium American Indian systems. All 15 were sent questionnaire packages. These systems and their Tribal governments completed the questionnaires in the same manner as the large and medium systems in the States. The completed questionnaires were sent to the appropriate EPA region and then to EPA headquarters for review. In cases in which project costs were unavailable, EPA estimated costs using models developed for medium systems in the States. Responses and modeled costs represent the total needs for medium American Indian water systems.

Over 98 percent of American Indian and all Alaska Native systems are small. The workgroup's procedure for estimating needs for these systems used existing IHS databases and information collected from a sample of water systems. The IHS databases provided system-by-system information on the need, taking into account the individual characteristics of each one. These databases, however, did not contain information on all the needs collected by the survey. Therefore, data from sampled systems were used to develop adjustment factors for the IHS data. These adjustment factors reflect the difference between the IHS costs and the costs reported by the systems surveyed. Separate adjustment factors were developed for American Indian and Alaska Native systems. Total needs for American Indian and Alaska Native water systems were derived from the IHS data and the adjustment factors.

For small American Indian systems, information was collected from 57 of the 682 systems nationwide. EPA staff or contractors, often accompanied by Tribal representatives, EPA regional Indian Coordinators, and Indian Health Service representatives, made on-site assessments at each of these systems and identified needs. Project costs were estimated using the models developed for small systems in the States.

Drinking water infrastructure needs for the 187 Alaska Native communities were estimated by a roundtable of the Alaska Native Health Board, the Alaska Area Native Health Service (part of the IHS), the Alaska Department of Environmental Conservation (Village Safe Water), and EPA. This group selected 20 representative Alaska Native water systems and identified needs for those systems. Five of the 20 systems were then visited to verify the accuracy of the needs assigned by the roundtable.

Needs Associated with the Safe Drinking Water Act. A portion of the needs collected in the survey are attributable to the SDWA. For existing regulations, systems were able to identify projects needed for compliance. In these cases, survey responses were used to derive the SDWA need. However, most systems were unable to identify projects needed to comply with proposed and recently promulgated regulations. Needs for these SDWA regulations are based on the national cost estimates published in the Federal Register when the regulations were proposed. Needs for other future regulations were taken from preliminary economic analyses prepared in anticipation of promulgating regulations.